

Level 2 Photo Documentation

Level 2 photo documentation of the cometary aerogel tiles and associated foils consisted of imaging each tile of aerogel at 20x magnification using the Leica MZ16A Stereo Microscope system and the DFC320 3.3 megapixel digital camera. These items are part of the Primary Scanning System (PSS) that was specifically developed for this purpose.

Aerogel - The magnification of 20x over the given area of a standard Stardust cometary tile (*i.e.*, 2 x 4 cm) required that 48 images be taken to cover the complete tile; eight columns by six rows with each image consisting of 2088 x 1550 pixels. After acquiring the images for a given cell or tile, the individual images were electronically joined to produce a mosaic image of each [tile](#) in the Cometary Collector or Tray.

Al Foils - The Aluminum (Al) foils associated with each cell were also imaged using the above mentioned Leica microscope system, with the vertical foils (west or east) utilizing a magnification of 60x and normally requiring 20 to 24 images to completely cover the vertical foil. The horizontal foils, on the other hand, were imaged at 50x requiring between 30 and 34 images to completely document one of the foils on the 4 cm long side of a given (north or south) cell. During imaging of the Al foils, polarizing lenses were utilized to reduce the glare of the light being reflected in to the camera path. Individual images for each foils were also electronically joined together to generate a mosaic image of each [foils](#).

15° Offset Images – Following the first three sample extractions made in support of the Preliminary Science Team, the remaining tiles were again scanned using the PSS with the optical path of the microscope system offset 15° to the left of normal to the collector / tray surface. This method was found to be superior for locating and identify smaller impacts in the aerogel collectors while still in the Cometary Tray. It also permits some measure and photo documentation various parameters associated with a given impact feature, including the size of the entrance hole (EH), the depth of penetration (Length), maximum bulb diameter (D_{max}), feature classification (*e.g.*, carrot, hedge hog, turnip, etc.), the diameter of the terminal particle (TP) or particles in many cases (depending on the type feature encountered), and the color (D – dark, L – light) of the terminal particles(s) in most cases.

It is hoped that these images might provide some useable information for interested researchers in making decisions on what features and/or particles to request materials from for study. The quality of the images is highly dependant on the amount of aerogel material that is included in the image (*i.e.*, between the camera and the feature), along with the size of the given impact feature in question. These features are assigned “temporary” feature numbers according to the cell number and sequence of documentation (*e.g.*, C2007-a-ZZ_), where “C2007” refers to cell 007 in the cometary tray, “a” refers to the first feature documented (X,Y coordinates are part of this process, usually the largest), and “ZZ” referring to the “Entrance Hole” (EH), “Terminal Particle” (TP), or if neither is present, the images is of the whole feature using a medium depth of focus setting.